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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,422	12/12/2003	Jeiwei Chang	HTIRC02-015	3911

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EXAMINER
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CHACKO DAVIS, DABORAH

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 11/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/734,422

Applicant(s)

CHANG ET AL.

Examiner

Daborah Chacko-Davis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-34, are rejected under 35 U.S.C. 102(e) as being anticipated by U. S. Patent No. 6,643,107 (Hasegawa et al., hereinafter referred to as Hasegawa).

Hasegawa, in col 5, lines 55-67, in col 6, lines 1-24, and lines 33-55, in col 7, lines 1-67, in col 28, lines 6-12, in col 29, lines 48-67, in col 30, lines 6-12, in col 41, lines 40-67, discloses a method of forming a magnetic head comprising a spin valve that includes laminating a substrate, an antiferromagnetic layer, a seed layer (first pinned layer), a second pinned layer, a nonmagnetic conductive layer (spacer layer), a free magnetic layer (free layer), a protective layer (capping layer, Ta), an upper core layer (lead layer), and an insulating layer of alumina formed on the lead layer (upper core layer), forming a resist mask on the spin valve (GMR stack, a sheet of material of first thickness ), wherein the width of the photoresist mask determines the width of the first pedestal (width R1), directing an ion beam at an angle relative to an axis perpendicular to the mask surface on

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the spin valve, wherein the substrate can be rotated or moved obliquely, the ion beam removing material in a region closest to the surface of the mask (undercut see figure 5), and removing material from a surface in the region extending outwards from a line (T10, shadowing effect of the mask) parallel of the side of the mask (forming a slope that extends outwards in the second pedestal region, see figure 3) at a distance from the mask as claimed (the distance determined by the height or thickness of the photoresist mask, causing the resist mask shadowing), and obliquely bombarding the stack with the ion beam as recited in the claims (the oblique angle of incidence of the beam at both sides being equal, symmetrical pedestal formation, see figures 8, and 12), thereby determining the width of the second pedestal, wherein the substrate can be obliquely moved or rotated with respect of the axis perpendicular to the surface of the substrate (claims 1, 9, 18, 25, 26-27). Hasegawa, in col 29, lines 49-54, and in col 30, lines 7-10, the ion beam source can be stationary or obliquely moved, and that the substrate can be rotated or moved or kept stationary with respect to the axis perpendicular to the substrate surface (claims 2-4, 10-12). Hasegawa, in col 28, lines 49-55, and in figures 2-3, and 5, discloses that the first angle and the second angle (angle A and angle B) are in the claimed ranges (shadowing effect angled ion beam impingement, and oblique incidence of the ion beam) (claims 5-6, 13-14, 21-22, 29, and 30). Hasegawa, in col 20, lines 5-57, in figures 5, and 12, discloses that the bottom pedestal is at least twice the width of the first pedestal (top pedestal) width with the claimed thickness, and the top pedestal possesses a steeper sidewall (undercut) than the bottom pedestal, and has the

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claimed aspect ratio, and thickness(claims 7-8, 15-17, 20, 23, 24, and 31-34). Hasegawa, in col 23, lines 25-47, and in col 24, lines 15-28, discloses that the magnetic head (spin valve magnetic material) has a GMR ratio of at least 1%, and less series resistance (less than 50 ohms) (claims 19, and 28).

### ***Response to Arguments***

3. Applicant's arguments filed August 18, 2006, have been fully considered but they are not persuasive. The 102 rejection made in the previous office action (paper no. 0510) is maintained.

A) Applicants argue that Hasegawa does not teach a mask that is not notched but has uniform width.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., A mask that is not notched but has uniform width) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

B) Applicants argue that Hasegawa does not teach using a hard mask instead of photoresist as recited in claim 27.

Claim 27, of the instant claims, recites a temporary mask that is either a photoresist or a slow etch rate hard mask material such as alumina or tantalum. Hasegawa teaches the use of a photoresist temporary mask. The claim as recited is not limited to just a hard mask material but also to a photoresist mask.

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C) Applicants argue that Hasegawa teaches a continuous 360° rotation of the beam relative to the stack and not a 180° sweep of the ion beam relative to the stack at any given time.

Hasegawa teaches an ion milling process that can be positioned at an oblique angle of incidence, i.e., the angle of the ion beam impinged on the photoresist mask is incident at either an acute angle or an obtuse angle (both the angles are within a 180 degree sweep).

D) Applicants argue that Hasegawa does not disclose that both the upper and lower pedestals are formed in a single operation.

Hasegawa performs a single ion milling process to form pedestals each of a different width, i.e., a first pedestal of a first pedestal width and a second pedestal of a second pedestal width. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the claims do not recite "forming both the upper and lower pedestals in a single operation, starting from a laminated sheet") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

E) Applicants argue that Hasegawa does not disclose that the angle of the ion beam changes as it is swept around, and that the upper pedestal and lower pedestal vary in their shapes without loss of alignment.

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Hasegawa, in col 29, lines 12-22, and 49-55, and in figures 2, and 5, discloses that the notched mask is formed due to oblique incidences of the ion beam during an ion milling process, i.e., the angles of incidences include acute angles and obtuse angles of incidence, resulting in pedestals as claimed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the claims do not recite "disclose that the angle of the ion beam changes as it is swept around, and that the upper pedestal and lower pedestal vary in their shapes without loss of alignment") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

### ***Conclusion***

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will

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the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd

November 11, 2006.



**JOHN A. MCPHERSON**  
**PRIMARY EXAMINER**